Contribution of Nutrients and *E. coli* to Surface Water Condition in the Ozarks Part II. Using Landscape Ecology and Partial Least Squares Predictions to Map Watersheds that are Vulnerable to Non-Point Source Pollution

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The US EPA's Office of Research and Development and U.S. EPA Region 7 have collaborated to map and interpret landscape scale (i.e., broad scale) ecological metrics among watersheds of the Upper White River and have produced the first geospatial models of water quality vulnerability in the Ozarks. These analyses utilized a combination of partial least squares (PLS), existing field water quality monitoring station data, remote sensing information, a priori information about landscape conditions, and the water quality of streams and rivers of the associated watershed(s). The analyses were conducted at multiple geographic scales, from the site-specific water quality measurements (fine-scale) to the broader-scale watershed analyses, which have been reported among 8-digit US Geological Survey hydrologic units and 244 customized subwatersheds. The 244 subwatersheds were customized for this project to increase the precision and accuracy of water quality vulnerability predictions and were based on watershed terrain and a single 'pour point' for each subwatershed where all runoff exits the watershed. Using PLS, we determined four different (surface) water quality conditions among the 244 customized subwatersheds of the Ozarks, which may be useful for important management decisions in the region: (1) subwatersheds that have high concentrations of total ammonia, high concentrations of total phosphorus, and high cell counts of *Escherichia coli* (*E. coli*); (2) subwatersheds that have high concentrations of total ammonia, low concentrations of total phosphorus, and high cell counts of *E. coli*; (3) subwatersheds that have low concentrations of total ammonia, low concentrations of total phosphorus, and high cell counts of *E. coli;* and (4) subwatersheds that have moderate concentrations of both total ammonia and total phosphorus and moderate *E. coli* cell counts. The results of this project provide watershed managers with the first broad-scale predictions that can be used to explain how land cover type, land cover configuration, environmental change, and human activities may affect the chemical and biological characteristics of surface water in the Upper White River region.

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